FUJITSU

SPARC Enterprise
T5440 Server

Overview Guide

C120-E507-01EN

FUJITSU

SPARC® Enterprise T5440 Server Overview Guide

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Preface

This manual provides an overview of the SPARC® Enterprise T5440 Server features.

FOR SAFE OPERATION

This manual contains important information regarding the use and handling of this product. Read this manual thoroughly. Use the product according to the instructions and information available in this manual. Keep this manual handy for further reference. Fujitsu makes every effort to prevent users and bystanders from being injured or from suffering damage to their property. Use the product according to this manual.

Related Documentation

The latest versions of all the SPARC Enterprise Series manuals are available at the following Web sites:

Global Site

http://www.fujitsu.com/sparcenterprise/manual/

Japanese Site

http://primeserver.fujitsu.com/sparcenterprise/manual/

Title	Description	Manual Code
SPARC Enterprise T5440 Server Product Notes	Information about the latest product updates and issues	C120-E508
SPARC Enterprise T5440 Server Site Planning Guide	Server specifications for site planning	C120-H029
SPARC Enterprise T5440 Server Installation and Setup Guide	Detailed rackmounting, cabling, power on, and configuring information	C120-E510
SPARC Enterprise T5440 Server Service Manual	How to run diagnostics to troubleshoot the server, and how to remove and replace parts in the server	C120-E512
SPARC Enterprise T5440 Server Administration Guide	How to perform administrative tasks that are specific to the servers	C120-E511
Integrated Lights Out Manager 2.0 User's Guide	Information that is common to all platforms managed by ILOM	C120-E474
Integrated Lights Out Manager 2.0 Supplement for SPARC Enterprise T5440 Server	How to use the Integrated Lights Out Manager (ILOM) software on the servers	C120-E513
SPARC Enterprise T5440 Server Safety and Compliance Guide	Safety and compliance information that is specific to the servers	C120-E509

Note – The Product Notes document is available only on the website. Please check for the recent update on your product.

Conventions for Alert Messages

This manual uses the following conventions to show alert messages, which are intended to prevent injury to the user or bystanders as well as property damage, and important messages that are useful to the user.

Warning – This indicates a hazardous situation that could result in death or serious personal injury (potential hazard) if the user does not perform the procedure correctly.

Caution – This indicates a hazardous situation that could result in minor or moderate personal injury if the user does not perform the procedure correctly. This signal also indicates that damage to the product or other property may occur if the user does not perform the procedure correctly.

Alert messages in the text

An alert message in the text consists of a signal indicating an alert level followed by an alert statement. Alert messages are indented to distinguish them from regular text. Also, a space of one line precedes and follows an alert statement.

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- Unpacking optional adapters and such packages delivered to the users

Product Handling

Maintenance

Warning – Certain tasks in this manual should only be performed by a certified service engineer. User must not perform these tasks. Incorrect operation of these tasks may cause electric shock, injury, or fire.

- Installation and reinstallation of all components, and initial settings
- Removal of front, rear, or side covers
- Mounting / de-mounting of optional internal devices
- Plugging or unplugging of external interface cards
- Maintenance and inspections (repairing, and regular diagnosis and maintenance)

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Server Features

This document describes the features of the SPARC® Enterprise T5440 server. The following topics are covered:

"SPARC Enterprise T5440 Server" on page 1

"Features at a Glance" on page 2

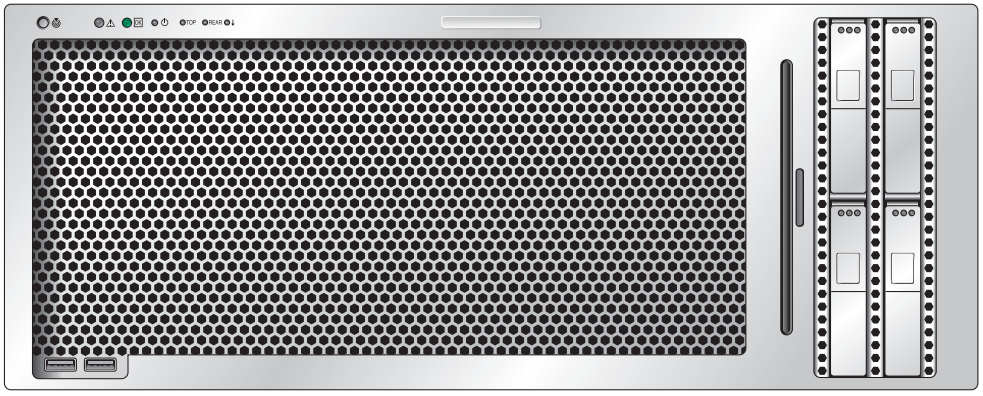
"Additional Feature Information" on page 4

SPARC Enterprise T5440 Server

The SPARC Enterprise T5440 server (FIGURE 1) is a scalable, reliable, high-performance server, optimized for enterprise data centers. This server offers the following key features:

- Up to four UltraSPARC® T2 Plus multicore, multithreaded, processors with CoolThreads technology for high throughput and energy savings.
- The latest QuadEthernet ASIC for high performance multithreaded networking.
- High levels of system uptime through the processor and memory reliability, availability, and serviceability (RAS) features. Redundancy of systems components, support for hardware RAID (0, 1), and the predictive self-healing features of the Solaris™ 10 Operating System (Solaris OS).
- A space efficient, rack-optimized form factor 4U chassis.
- Investment protection with SPARC V9 binary application compatibility and the Solaris 10 OS. The Solaris 10 OS also provides features such as Solaris Predictive Self-Healing, Solaris Dynamic Tracing, and support across UltraSPARC platforms.
- Unified server management through the use of the Integrated Lights Out Manager (ILOM) system controller interface. ILOM integrates and manages CoolThreads™ and x64 platforms with the same tool set, in heterogeneous environments, using industry standard element management tools and enterprise frameworks.

FIGURE 1 SPARC Enterprise T5440 Server



Features at a Glance

TABLE 1 lists the features of the SPARC Enterprise T5440 server.

TABLE 1 Feature Specification Table

Feature	Specifications
Chassis dimensions and rackmounting hardware	**T5440 – 4 rack units (4U):** Width Height Depth Inches 16.75 6.98 28.125 Millimeters 425 176 714
Processor	Up to four UltraSPARC T2 Plus multicore, multithreaded, processors, each with one of the following number of cores: • 6 cores (48 x 4, for a total of 192 concurrent threads) • 8 cores (64 x 4, for a total of 256 concurrent threads)
Memory Slots/Capacity	Up to 64 FB-DIMM slots (16 slots per processor) supporting 2 and 4–GB modules (maximum capacity of 256 GB of system memory).
Internal Hard Drives	Up to four, 73-GB or 146-GB, 2.5-inch SAS hard drives (hot-pluggable). Integrated hard drive controller supports RAID 0 and RAID 1.
Optical Media Device	One slot-loading, slimline DVD drive, supporting CD-R/W, DVD-R/W, DVD+R/W
Power Supplies	Four hot-swappable power supply units providing N+2 redundancy

TABLE 1 Feature Specification Table *(Continued)*

Feature	Specifications
Ethernet Ports	Four 1-Gb Ethernet, RJ-45-based, autonegotiating ports. 10-Gb Ethernet ports are available by adding XAUI cards to the I/O expansion slots. For each XAUI card added, one onboard 1-Gb Ethernet port is disabled.
I/O Expansion slots	Eight PCI Express expansion slots with the following slot designated specifications*: • All 8 slots support PCIe, 8-lane • Two slots support 16-lane cards operating at 8 lanes. • Two slots also support 10-Gb Ethernet XAUI cards. (Shared with PCIe slot.) • Up to 20 additional PCIe slots are available using up to two External I/O Expansion Units All of the internal PCIe slots support standard half-length, low-profile PCIe cards.
USB Ports	Four USB 2.0 ports (2 forward, 2 rear facing)
Additional Ports	The following connectors are located on the rear of the server: • One RJ-45 serial management port (SER MGT)—the default connection to the system controller • One 10/100 Mbps Ethernet network management port (NET MGT) – connection to the system controller • One DB-9 serial port – connection to the host
Remote Management	On-board system controller, running Integrated Lights Out Manager (ILOM) 2.0 with the following command sets: • ILOM command-line interface • ILOM browser interface • SNMP interface • IMPI interface • ALOM CMT compatibility shell (legacy command set) These command sets are accessible through the RJ-45 serial and 10/100 Mbps Ethernet interfaces.
Cryptography	Processor integrated cryptographic acceleration that supports industry standard security ciphers
Operating System	Solaris 10 OS preinstalled on disk 0 Refer to the server product notes for information on the minimum version of supported OS and required patches
Other Software	**Java Enterprise System with a 90-day trial licence** Logical Domains Manager Sun Studio 12

* PCIe and PCI-X specifications described in this table list the physical requirements for PCI cards. Additional support capabilities must also be provided (such as device drivers) for a PCI card to function in the server. Refer to the specifications and documentation for a given PCI card to determine if the required drivers are provided that enable the card to function in this server.

Additional Feature Information

Chip-Multithreaded Processor and Memory Technology

The UltraSPARC T2 Plus multicore, multithreaded, processor is the basis of theSPARC Enterprise T5440 server. Up to four UltraSPARC T2 Plus processors can be installed.

The UltraSPARC T2 Plus processor is based on chip-multithreading (CMT) technology that is optimized for highly threaded transactional processing. The UltraSPARC T2 Plus processor improves throughput while using less power and dissipating less heat than conventional processor designs.

Depending on the model purchased, each processor chip has six or eight UltraSPARC cores. Each core has two integer pipelines, each pipeline runs four threads, for a total of eight threads per core.

Additional processor components, such as L1 cache, L2 cache, memory access crossbar, memory controllers, and the I/O interface have been carefully tuned for optimal performance.

Enhancements

The SPARC Enterprise T5440 server expands the CoolThreads family to include dual socket systems. It delivers extremely high compute density with up to 256 threads in 4 rack units.

The SPARC Enterprise T5440 server provides advanced power management through the UltraSPARC T2 Plus power management features that work at both the core and the memory levels of the processor, including the ability to reduce instruction issue rates, parking of idle threads and cores, and the ability to turn off clocks in both cores and memory to reduce power consumption.

In addition, this server offers the following features:

High memory density with up to 256 GB in four rack units.

High internal storage capacity with over 500 Gbytes available.

Robust I/O bandwidth with 8 lanes available in all of the PCIe slots.

Eco-responsibility through the use of power supplies that are compliant with 80 Plus and Climate Savers computing initiatives.

Preinstalled Solaris Operating System

The SPARC Enterprise T5440 server is preinstalled with the Solaris 10 OS, and offers the following Solaris OS features:

Stability, high performance, scalability, and precision of a mature 64-bit operating system

Support for over 5,000 leading technical and business applications, and thousands of Java™ based services.

Solaris Containers – Isolate software applications and services using flexible, software-defined boundaries.

DTrace – A comprehensive dynamic tracing framework for tuning applications and troubleshooting systemic problems in real time.

Predictive Self-Healing – Capability that automatically diagnoses, isolates, and recovers from many hardware and application faults.

Security – Advanced security features designed to protect the enterprise at multiple levels.

Network Performance – Completely rewritten TCP/IP stack dramatically improves the performance and scalability of your networked services.

You can use the preinstalled Solaris 10 OS, or reinstall a supported version of the Solaris 10 OS from your network, CD, or downloaded copy. In some cases, if you reinstall the Solaris OS, you must also install patches. Refer to the *SPARC Enterprise T5440 Server Product Notes* for information on the supported OS releases and mandatory patches for your server.

Hardware-Assisted Cryptography

The UltraSPARC T2 Plus multicore, multithreaded processors provide hardware-assisted acceleration of symmetric, asymmetric, hashing and random number generation cryptographic operations as follows:

Asymmetric algorithms – RSA, DSA, Diffie Hellman, and Elliptic Curve cryptography

Symmetric algorithms – AES, 3DES, and RC$

Hashing algorithms – SHA1, SHA256, and MD5

The Solaris 10 OS provides the multithreaded device driver that supports the hardware-assisted cryptography.

Support for Virtualization Through Logical Domains

The SPARC Enterprise T5440 server supports the use of open source Logical Domains (LDoms) technology. Through the use of the Solaris OS and the built-in server firmware, and by installing the Logical Domains Manager software, you can virtualize the compute services that run on your server.

A *logical domain* is a discrete, logical grouping with its own operating system, resources, and identity within a single computer system. Each logical domain can be created, destroyed, reconfigured, and rebooted independently, without requiring a power cycle of the server.

You can run a variety of applications software in different logical domains and keep them independent for performance and security purposes.

Each logical domain can be managed as an entirely independent machine with its own resources, such as:

- Kernel, patches, and tuning parameters
- User accounts and administrators
- Network interfaces, MAC addresses, and IP addresses

Each logical domain can interact only with those server resources made available to it. The configuration is controlled using the Logical Domains Manager.

For more information on Logical Domains, refer to the *Logical Domains (LDoms) Administration Guide*.

Remote Manageability With ILOM

The Integrated Lights Out Manager (ILOM) feature is a system controller, built into the server, that enables you to remotely manage and administer the server.

The ILOM software is preinstalled as firmware, and initializes as soon as you apply power to the system.

ILOM enables you to monitor and control your server over an Ethernet connection (supports SSH), or by using a dedicated serial port for connection to a terminal or terminal server. ILOM provides a command-line interface and a browser-based interface that you can use to remotely administer geographically distributed or physically inaccessible machines. In addition, ILOM enables you to run diagnostics (such as POST) remotely that would otherwise require physical proximity to the server's serial port.

You can configure ILOM to send email alerts of hardware failures and warnings, and other events related to the server. The ILOM circuitry runs independently of the server, using the server's standby power. Therefore, ILOM firmware and software continue to function when the server operating system goes offline or when the server is powered off. ILOM monitors the following SPARC Enterprise T5440 server conditions:

- CPU temperature conditions
- Hard drive status
- Enclosure thermal conditions
- Fan speed and status
- Power supply status
- Voltage conditions
- Solaris watchdog, boot time-outs and automatic server restart events

In addition to the ILOM CLI and browser interface, you can set up the server to use an ALOM CMT compatibility CLI. The ALOM CMT compatibility CLI provides commands that approximate the ALOM CMT UI that is a system controller interface provided on some previous servers.

High Levels of System Reliability, Availability, and Serviceability

Reliability, availability, and serviceability (RAS) are aspects of a system's design that affect its ability to operate continuously and to minimize the time necessary to service the system. *Reliability* refers to a system's ability to operate continuously without failures and to maintain data integrity. System *availability* refers to the ability of a system to recover to an operational state after a failure, with minimal impact. *Serviceability* relates to the time it takes to restore a system to service following a system failure. Together, reliability, availability, and serviceability features provide for near-continuous system operation.

To deliver high levels of reliability, availability, and serviceability, the SPARC Enterprise T5440 server offers the following features:

- Ability to disable individual threads and cores without rebooting
- Lower heat generation, reducing hardware failures
- Hot-pluggable hard drives
- Redundant, hot-swappable power supplies (four)
- Redundant N+1 hot-swappable fan modules
- Environmental monitoring
- Internal hardware drive mirroring (RAID 1)
- Error detection and correction for improved data integrity

Easy access for most component replacements

Hot-Pluggable and Hot-Swappable Components

SPARC Enterprise T5440 server hardware is designed to support hot-plugging of the chassis-mounted hard drives, and hot-swapping of fan units power supplies. By using the proper software commands, you can install or remove these components while the system is running. Hot-swap and hot-plug technology significantly increases the system's serviceability and availability by providing the ability to replace hard drives, fan units, and power supplies without service disruption.

Power Supply Redundancy

The SPARC Enterprise T5440 server provides four hot-swappable power supplies, enabling the system to continue operating should one of the power supplies fail or if a power source fails.

Environmental Monitoring

The SPARC Enterprise T5440 server features an environmental monitoring subsystem that protects the server and its components against:

Extreme temperatures

Lack of adequate airflow through the system

Power supply failures

Hardware faults

Temperature sensors are located throughout the system to monitor the ambient temperature of the system and internal components. The software and hardware ensure that the temperatures within the enclosure do not exceed predetermined safe operating ranges. If the temperature observed by a sensor falls below a low-temperature threshold or rises above a high-temperature threshold, the monitoring subsystem software lights the amber Service Required LEDs on the front and rear panels. If the temperature condition persists and reaches a critical threshold, the system initiates a graceful system shutdown. In the event of a failure of the system controller, backup sensors protect the system from serious damage, by initiating a forced hardware shutdown. Service Required LEDs remain lit after an automatic system shutdown to aid in problem diagnosis.

The power subsystem is monitored in a similar fashion by monitoring power supplies and reporting any fault in the front and rear panel LEDs.

Support for RAID Storage Configurations

You can set up hardware RAID 1 (mirroring) and hardware RAID 0 (striping) configurations for any pair of internal hard drives, providing a high-performance solution for hard drive mirroring.

By attaching one or more external storage devices to the server, you can use a RAID software application such as Solstice DiskSuite™ or VERITAS Volume Manager[1] to configure system drive storage in a variety of different RAID levels.

Error Correction and Parity Checking

The UltraSPARC T2 Plus multicore, multithreaded, processor provides parity protection on its internal cache memories, including tag parity and data parity on the D-cache and I-cache. The internal L2 cache has parity protection on the tags, and ECC protection on the data.

Advanced ECC corrects up to 4 bits in error on nibble boundaries, as long as they are all in the same DRAM. If a DRAM fails, the DIMM continues to function.

Fault Management and Predictive Self Healing

The SPARC Enterprise T5440 server provides the latest fault management technologies. The Solaris 10 OS architecture provides a means for building and deploying systems and services capable of *Predictive Self-healing*. Self-healing technology enables systems to accurately predict component failures and mitigate many serious problems before they actually occur. This technology is incorporated into both the hardware and software of the of the server.

At the heart of the predictive self-healing capabilities is the Solaris Fault Manager, a new service that receives data relating to hardware and software errors. This service also automatically and silently diagnoses the underlying problem. Once a problem is diagnosed, a set of agents automatically responds by logging the event, and if necessary, takes the faulty component offline. By automatically diagnosing problems, business-critical applications and essential system services can continue uninterrupted in the event of software failures, or major hardware component failures.

Rackmountable Enclosure

The SPARC Enterprise T5440 server uses a space-saving 4U-high rackmountable enclosure that can be installed into a variety of industry standard racks.

1. Software RAID applications such as VERITAS Volume Manager are not included with this server. You must obtain and license them separately.

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